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ABSTRACT

Research suggests that project learning has great potential to foster a comprehensive knowledge base for teachers. This paper describes the rationale for weaving project learning into early childhood teacher education programs and describes how teacher educators can effectively implement the strategy in their curriculum. Included is a discussion of how projects support brain-based learning research and how projects support specific learning goals in early childhood teacher education. These include specific knowledge, skills, dispositions, and feelings that are cultivated and supported by this approach. The paper offers suggestions, with examples, for using projects throughout the teacher education program. Suggestions include introductory course experiences that students may have prior to selecting teaching as a major and advanced experiences students could have once they have made a commitment to early childhood teacher education. The paper describes a specific design for implementing projects in any early childhood teacher education classroom, such as providing initial orientation, brainstorming, investigating the topic, developing the final products, and evaluating students. (Contains 16 references and 4 tables.) (Author/HTH)

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Learning through Projects in Early Childhood Teacher Education

Lorraine DeJong

Abstract

Research suggests that project learning has great potential to foster a comprehensive knowledge base for teachers. This paper describes the rationale for weaving project learning into early childhood teacher education programs and describes how teacher educators can effectively implement the strategy in their curriculum. Included is a discussion of how projects support brain-based learning research and how projects support specific learning goals in early childhood teacher education. These include specific knowledge, skills, dispositions, and feelings that are cultivated and supported by this approach. The paper offers suggestions, with examples, for using projects throughout the teacher education program. These include introductory course experiences that students may have prior to selecting teaching as a major and advanced experiences students could have once they have made a commitment to early childhood teacher education. The paper describes a specific design for implementing projects in any early childhood teacher education classroom. Steps include providing initial orientation, brainstorming, investigation of the topic, developing the final products, and student assessment.

As we enter into a new millennium, faculty in early childhood teacher preparation programs find themselves faced with two major challenges. First, there is the struggle to articulate a professional knowledge base for early childhood teacher education that will best prepare educators to face the demands of teaching in an increasingly dynamic, technological, and diverse society. Simultaneously, there is the challenge to design instructional models that will effectively help teachers *acquire* the common core of knowledge and abilities that they will need to teach young children now and in the future. In this article, I would like to share how project-based learning can assist early childhood teachers to acquire the needed knowledge base that includes professional skills, attitudes, and dispositions that will strengthen their effectiveness as teachers of young children.

Research suggests that project learning has the potential to foster a comprehensive knowledge base for teachers (Caine & Caine, 1997; Damon, 1995) that supports recently established guidelines and standards for teacher preparation programs (National Board for Professional Teaching Standards (NBPTS), 1995; NAEYC, 1996; National Council for Accreditation of Teacher Education (NCATE), 1997). Further, projects have the potential to increase student motivation for learning (Meece & McColskey, 1997). Because of their power to achieve multiple goals in teacher preparation, it is important to weave project learning into the total fabric of a professional education program.

What Is a Project in Teacher Education?

Long-term projects in teacher education are authentic tasks related to children, schools, and/or teaching that actively engage learners over an extended period of time (Damon, 1995; Katz & Chard, 1995; Meece & McColskey, 1997). In a project, small groups of students choose and

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then participate in an in-depth investigation of a topic that is of interest and relevance to them. Throughout the assignment, students pose questions of what they would like to learn, then seek answers to their questions through numerous investigative activities. They examine relevant empirical research and other professional literature. They observe, interview, and interact with many individuals inside and outside the classroom. Students engage in brainstorming sessions with peers and with the instructor and create final products to share with classmates and other students and professionals outside the classroom. Throughout the project, the instructor serves as a coach who oversees the students' learning by selecting appropriate tasks, diagnosing problems, providing challenges, offering feedback (Damon, 1995; Katz & Chard, 1995), and assisting students in their collaborative efforts.

Whereas several scholars have documented the pedagogical rationale for using projects in education for all students (Blumenfeld et al., 1991; Damon, 1995; Meece & McColskey, 1997), and others have provided a rationale with strategies for using projects with children in early childhood settings (Katz & Chard, 1995; Chard, 1998; Elliott, 1998; Katz, 1994), little has been written on how project learning specifically contributes to the development of future teachers in early childhood education, and how projects may be incorporated into the conceptual framework of an early childhood teacher education program. In the remainder of this article, I will describe: (1) how projects support recently reported brain research on human learning and recently established knowledge base standards for early childhood teacher education; (2) suggestions for infusing projects within a total early childhood teacher education program; and (3) specific strategies for implementing project work in early childhood teacher education classes, including ideas for student activities and assessments.

Projects and Brain-based Learning

In *Education on the Edge of Possibility*, Caine and Caine (1997) draw on recent research from cognitive psychology and the neurosciences to propose an instructional theory that is derived from brain-based learning principles. A listing of these principles is shown in Table 1. In their theory, the learner is transformed from being an absorber of information to one who interacts dynamically with it. When curriculum and instruction support brain-based principles, learning is maximized.

Project learning supports and reinforces many of the principles emphasized in brain-based learning. One principle posits that everyone's brain is *uniquely organized* and that students will express individual differences through their learning styles, talents, and abilities. Projects offer students the opportunity to develop and apply their own set of attributes by

Table 1

Brain-based Learning Principles (Caine & Caine, 1997, p. 19)

Principle 1: The brain is a complex adaptive system.
Principle 2: The brain is a social brain.
Principle 3: The search for meaning is innate.
Principle 4: The search for meaning occurs through "patterning."
Principle 5: Emotions are critical to patterning.
Principle 6: Every brain simultaneously perceives and creates parts and wholes.
Principle 7: Learning involves both focused attention and peripheral perception.
Principle 8: Learning always involves conscious and unconscious processes.
Principle 9: We have at least two ways of organizing memory.
Principle 10: Learning is developmental.
Principle 11: Complex learning is enhanced by challenge and inhibited by threat.
Principle 12: Every brain is uniquely organized.

engaging them in a variety of flexible investigative experiences. Students select their own topics, design many of their own learning tasks (including field experiences), decide how and by whom tasks will be completed, and report findings that are the most important to them in ways that are most agreeable to their learning styles.

When students participate in projects, they engage in frequent *social interactions*. This is important now that we know that the brain is a *social brain*. Throughout a project, students have multiple opportunities to exchange information with a partner, classmates, instructor, and others at the university and within the community.

Project learning supports the principle that the brain simultaneously *perceives and creates parts and wholes*. Not only do projects provide opportunities for students to learn specific knowledge and skills, they encourage students to see the "whole picture." This is because much of what is experienced through projects is connected to real-life situations in the home, school, or community that are complex and multifaceted. In project learning, students are less prone to use their brains to memorize "right answers" about information, but are challenged instead to reorganize information in ways that will encourage them to remember how to apply specific knowledge and skills in variable contexts, such as with children in schools (Caine & Caine, 1997, p. 167).

Project learning supports a student's continuous search for meaning through the *construction of patterns*. Because a project allows students to choose the subtopics and questions they are most interested in learning about, their search for meaning is driven by their own past experiences, purposes, and beliefs. Further, what students ultimately learn from participating in a project is a personal consolidation, rather than a summation, of their experiences.

Complex learning related to young children's behavior, instruction, and schools is enhanced through projects. This is because the work of independently figuring out what one wants to know and then going out into the real world to seek out answers is often quite challenging. However, threats, which could potentially inhibit complex learning, are greatly minimized. For example, the threat of grade anxiety (common among college students) is reduced because students have an entire semester to plan and organize their project tasks, they share the workload with other students, and they receive frequent feedback from the instructor. Further, multiple methods of assessment, that offer students many opportunities to improve, are used for evaluation.

Finally, project learning encourages students to use both *conscious* and *unconscious processes*. As students participate in meaningful investigative tasks in real school settings, they take in knowledge through all of their senses. Students are directly aware of some of what they learn; however, other understandings and/or insights may not be realized until much later. Only after reflecting with others (i.e., partner and/or instructor) and by oneself throughout the project, do students construct their own personal knowledge from their experiences. For many, there will be the realization that they learned much more than they expected and certainly much more than they would have through less active and less personally meaningful strategies.

Projects and Learning Goals in Early Childhood Teacher Education

Projects not only support brain-based learning, they also provide a mechanism for those of us in teacher education to help students achieve *multiple goals* in teacher preparation as outlined in standards for initial certification of teachers (NAEYC, 1996; NBPTS, 1995; NCATE, 1997). These include the knowledge, skills, dispositions, and feelings that are necessary for successful interaction with young children, families, and other professionals inside and outside the classroom.

Knowledge

We know that effective teachers of young children possess a keen understanding of child development, teaching and learning theory, curriculum development and implementation, family and community relationships, assessment and evaluation, and professionalism. Participating in projects allows students to gain knowledge in several of these domains. Students read relevant professional literature on an important topic

in early childhood, collaborate with one another and with the instructor, and engage in fieldwork. Field experiences offer students many opportunities to directly observe and interact with young children, school personnel, and families in naturalistic settings related to their topic of interest. Because a project encourages students to discuss their investigative interests and experiences, and to collaborate on a final product, they acquire, clarify, and enrich data from a variety of venues. Moreover, as students choose and seek out community persons and organizations having expertise with their topic, they gain professional knowledge of the community resources available to assist children and families. Lastly, project learning shows participants how to integrate information in meaningful ways so that they will hopefully be able to create similar learning opportunities for their own students.

Skills

Effective early childhood educators demonstrate a range of social, academic, communication, and self-management skills that will allow them to work effectively with young students, parents, colleagues, supervisors, and members of the community. Projects offer students multiple opportunities to practice collaboration and cooperation as they work with a classmate to brainstorm investigative questions, plan and participate in field experiences, discuss observations, and develop final products. As students struggle to pace and coordinate the numerous investigative tasks among themselves, they practice self-management skills. Throughout the project, it is important for faculty to schedule regular progress meetings. They allow instructors to monitor how the project is progressing and help students to practice defusing conflicts that may periodically exist between partners before they adversely affect an investigation. Other skills that are practiced and strengthened, especially during fieldwork activities, include student observation, questioning, and interview skills. As they design final products, students often have many opportunities to practice the skills of oral and written communication, teaching, and technology.

Dispositions and Feelings

Effective teachers are expected to feel confident with their teaching assignments, comfortable with the children in their classrooms, and respected by colleagues, supervisors, staff, parents, and the community. They are expected to possess dispositions that will enable them to work through difficult challenges and stay committed to their profession. Some of these dispositions include curiosity and interest in learning, self-awareness, intrinsic motivation, humor, enthusiasm, helpfulness, perseverance, high expectations, challenge seeking, and respect and appreciation for another person's time, contributions, and efforts. Many of these feelings and dispositions are strengthened during project work because students have much autonomy over what topic they will study, what directions their investigation will take, what fieldwork they would like to participate in, and what final products to develop. Through individual reflections of each field experience, students gain self-awareness of their personal interests, values, insights, competencies, and challenges. Through regular consultation with their peers and the instructor, confidence and perseverance in their work are fostered. Finally, as students observe and interview children, parents, teachers, and other adults within the community, they grow to appreciate and value the contributions made by many to the education of young children and the interdependency of these relationships. The following reflection of one early childhood education major who participated in project learning during her teacher education training summarizes how projects have the potential to foster multiple learning goals in teacher education:

> The project experience was great for me because I learned so much more than I expected from the field research and from my partner. I particularly enjoyed working with a partner on the project because although we divided the workload and worked separately on different aspects of the research, we came together to plan our strategies and class presentation. This is a good lesson for our future work with other teachers in areas such as team curriculum planning and team teaching. I not only learned a lot about my topic and those of my classmates, I now find I am an advocate not only for my own project topic but also for using projects in teaching.

Suggestions for Using Projects within the Teacher Education Program

Introductory Course Experiences

It is not uncommon at many universities for undergraduate students to begin their professional preparation in an early childhood teacher education program by participating in courses in child growth and development. At some universities, these courses may not be limited to early childhood education majors. There may be students seeking other education certifications and/or seeking majors from other departments. Students who enroll in these courses often come with varied interests, backgrounds, and levels of motivation. In my experience, infusing projects into the curriculum helps to make introductory child development courses more meaningful for everyone. This has often contributed positively to undecided undergraduate students choosing early childhood education as a major.

Implementing projects during the early stages of the teacher education program is effective because they allow all students a chance to explore and pursue important personal learning goals while at the same time strengthening their knowledge base of issues related to child development. Students considering early childhood education as a major can choose topics that are of specific interest to them within the field of early child development. Examples of topics chosen by different types of undergraduate students enrolled in an introductory growth and development course are provided in Table 2.

Experiences within the Early Childhood Education Major

As students progress within their professional training programs, projects must continue to provide a meaningful context for learning, especially if we hope that our students will one day implement the Project Approach with their own students in early childhood classrooms. Methods courses are designed to help students become more knowledgeable of appropriate

Table 2

Examples of Project Topics of Students in an Introductory Teacher Education Course in Child Growth and Development

Committed Early Childhood Education Majors	Other Education Majors, Non-Education Majors, Undecided Students
Grouping students in the ECE classroom	Homelessness and child development
Gender identity development in early childhood	Adoption and child development
Music education and early childhood development	
Drug-exposed children in the ECE classroom	Understanding the children of teenage parents
Retention in ECE	Children with ADHD
Competitive sports and early child development	Divorce and child development
Dealing with death in early childhood	Father's role in child development
Child abuse in early childhood	Violence and child development
Bullies in early childhood	Guidance counselors in the elementary school
	Home schooling and child development
Young children and television	Year-round schooling and child development
Friendship in early childhood	Effective schools for children living in poverty
	Japanese vs. American childhood education
Young children's understanding of money	

ways to design curriculum and instruction for young children. What better way to help students learn about brain-based learning models of early childhood curriculum and instruction (i.e., constructivism), than by engaging them in one? Examples of project topics chosen by students enrolled in a senior level course in early childhood curriculum and instruction are summarized in Table 3.

To enrich the project learning experience for both students and faculty, instructors may choose to engage in *mentoring relationships* with students. In a mentoring relationship, instructors actively explore and participate in project investigations along with their students. The instructor continues to model and support literate approaches to solving rich conceptual problems (i.e., how to get the knowledge or do the tasks that are of interest) and provide scaffolding to help student teams perform their investigative tasks. However, in addition, faculty work with students to brainstorm subtopics for investigation, assist in the development of investigative questions, solicit resources, read new research and/or literature, and participate in and reflect on novel fieldwork experiences.

Table 3

Examples of Projects of Early Childhood Teacher Education Majors Enrolled in an Advanced Methods Course

Understanding the Multi-age Early Childhood Classroom (K-2)
Incorporating Technology in the Early Childhood Classroom
Inclusion in the Early Childhood Classroom
Designing Outdoor Nature Playgrounds for Early Childhood Programs
Incorporating Drama in the Early Childhood Classroom
Head Start Programs in Early Childhood Education
Community Services for Young Children in Early Childhood Education
The Role of the Parent Educator in Early Childhood Education
Inclusion of Linguistically Diverse Students in the Early Childhood Classroom
Understanding Child Abuse in the Early Childhood Classroom
The Role of Aides and Assistants in the Early Childhood Classroom
The Homeless Child in an Early Childhood Classroom
Adopted Children in the Early Childhood Classroom

This adaptation of the project learning design not only has the potential to enhance learning for students and faculty, it has been my experience that it also has the potential to strengthen the personal relationship between preservice teachers and their college supervisors. This is because students form stronger identifications with those persons who share rewarding and challenging life experiences with them. We already know that the cooperating teacher plays an important role in the development of a beginning teacher because of their shared experiences in a classroom. Strong personal relationships between university faculty and students created from shared personal experiences before student teaching can likewise be salient to novice teachers. This is because students are likely to feel comfortable seeking assistance and support from faculty they are close to during times when they are struggling to address challenging situations and consolidate their professional beliefs and commitments.

When students collaborate with faculty on projects, there are other benefits. They experience firsthand what it feels like to work with other education professionals. Through direct observation of their instructors, students see that learning remains a lifelong process for all educators. Both experiences can lead to a stronger knowledge base for young teachers as they begin their professional roles in schools.

Implementing Projects in the Early Childhood Teacher Education Classroom

In the final section of this article, I would like to share how I have implemented the Project Approach with college students. The design is adapted from the three-phase model described by Katz and Chard (1995) in their book, *Engaging Children's Minds: The Project Approach*.

I. Getting Started

Orientation

To provide as much time as possible to explore topics of interest, students are oriented to their project assignment during the first week of classes. During this initial week, students choose a topic of interest, become acquainted with a classmate with a similar interest who will work with them for the duration of the term, and receive a timeline with recommended dates for completing project tasks. These tasks include initial brainstorming about the topic, formulating questions about the topic, working on library and Internet searches, participating in fieldwork experiences, meeting as teams with the instructor, and developing final products. It is important to establish reasonable timelines for students to complete project tasks in conjunction with periodic progress reports because they help keep everyone actively focused on their investigations (Harmin, 1994).

During the initial orientation, students are encouraged to generate topics of interest to them. In the event students in advanced classes have some knowledge of their student teaching placements, they may choose projects related to specific teaching issues and/or situations of interest at their schools. Once students are paired with a partner who shares a similar interest (regardless of knowledge), they are ready to begin the next task of phase one.

Brainstorming

After orientation, students within each team brainstorm with one another what they already know about their topic and what they think they might like to learn. The initial brainstorming conversations create interest about what is to be read, studied, and investigated. They help to chart a course for the students' study and decide the scope of the investigation. They may be revised at any point throughout the investigation as students generate new questions of interest and develop new understandings from their experiences. By the end of the first or second week of the term, students complete a partial K-W-L and a web or concept map (Katz, 1994) on their topics. The web is often revised, as students become more involved in their investigative activities. An example of a project web two students developed on the topic of multi-age classrooms in early childhood education is provided in Figure 1.

Figure 1.

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II. Investigating the Topic

Viewed as the "heart and soul" of project work, phase two consists of the direct investigation of the topic through a variety of tasks and activities. These may include searching the library and Internet, viewing videos and other expert presentations, conducting interviews and surveys of children and/or adults, observing individual and/or groups of children, and/or directly participating with children and/or adults. Depending on the topic and the personal project interests of students, field experiences often lead students into schools, district offices, community agencies, local businesses, and individual homes. At least twice during the term, students have a conference with the instructor to discuss specific project directions, questions about their investigations, fieldwork issues, revisions to web diagrams, final products, and any other personal concerns they might have regarding their work on their projects.

III. Developing the Final Products

Near the end of the term, students present their findings to classmates and others. Student teams lead a 20- to 25-minute multimedia presentation for their classmates that summarizes what they learned through their investigations. Students may decide to show clips from videos (which some students may develop), use computer visual displays (i.e., PowerPoint presentations), give demonstrations, administer short class pretests, show pictures and/or reference materials, share results of surveys, play audiotapes, use overheads, or perform role plays, and so forth. One requirement that I have is that both partners be equally involved in the presentation and that they distribute to classmates a two-page handout that highlights the team's major investigative efforts, findings, and bibliographic references. A second requirement is for students to submit a notebook that summarizes their project findings. Their notebook contains a reference list of 15 to 20 current library/Internet resources on their topic and a paper (five to seven pages) that analyzes what they learned from their readings and field research (L in the K-W-L). Finally, each student submits a personal reflection paper on his or her project learning experience (shared with instructor only). As a culminating activity, many students share their findings with other classes, teachers, and principals. Students may also share their findings with the broader professional community by placing their project reports on the World Wide Web, and/or presenting their findings at professional meetings and conferences.

Assessment of the Project

To help students develop a sense of competency and efficacy, I have found that students need clear goals, expectations, and feedback for their project assignments. An example of how projects may be evaluated is shown in Table 4. The project evaluation instrument supports brain-based research and includes multiple ways for students to demonstrate competence (Meece & McColskey, 1997, p. 42). By distributing the evaluation instrument early in the term, along with a suggested timeline for completion of specific tasks, students have several opportunities to clarify items and issues related to the evaluation. Up until the completion date, students may submit samples of project work for the instructor to review and may redo tasks as needed to reach the acceptable standards for each. In my experience, this assessment approach minimizes grade anxiety and enhances student intrinsic motivation.

Conclusion

Although project-based instruction is not a new idea in education (Dewey, 1956; Kilpatrick, 1926), it has never been systematically developed for effective use within programs of early childhood teacher education. Clearly, learning through projects can be both vital for teacher competence and meaningful and motivating for students. Recent research now suggests that it is not only an effective learning strategy for young children, but is also an especially useful strategy to foster dispositions, motivations, and professional habits that are as important as knowledge to the success of beginning classroom teachers. The time is right to make project learning an integral part of early childhood teacher education.

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Table 4
Project Evaluation Instrument

K-W (from K-W-L) (5 points)
Items of interest described; prior knowledge indicated

Web (5 points)
Comprehensive: Range of subtopics identified; specific subtopics investigated highlighted

Investigative Questions (5 points)
At least 5 clearly stated questions per observation/interview/field experience

Logs and Reflections of Investigative Field Experiences (20 points)
At least 5 field experiences clearly documented and individually analyzed

References (10 points)
At least 15 current professional resources (5 may be Internet resources) listed using APA guide

Class Handout (10 points)
Two-sided, legible, accurate, and informative to share with class

Project Summary (20 points)
Thorough and comprehensive (5-7 pages); appropriate references cited; personal reflection of project experience included

Oral Presentation (15 points)
Timed within limits; incorporates multimedia; both students actively involved

Professionalism (10 points)
Final products submitted on time; notebook typed and well organized; progress appointments with partner and instructor consistently kept

Total (100 points)

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